A-1 Urban Water Conservation Grant Application Cover Sheet

1. Applicant: San Diego County Water Authority

2. Project Title: Commercial Landscape Incentive Program

3. Person authorized to sign and submit proposal:

Ken Weinberg
Director of Water Resources
4677 Overland Avenue
San Diego, CA 92123
Phone: (858) 522-6741
Fax: (858) 268-7881
kweinberg@sdcwa.org

4. Contact person:

Vickie V. Driver
Water Resources Specialist
4677 Overland Avenue
San Diego, CA 92123
Phone: (858) 522-6760
Fax: (858) 268-7881
Vdriver@sdcwa.org

5. Funds requested: $1,125,000

6. Applicant funds pledged:
   - Local Cost Share: $ 202,500
   - Customer Matching: $1,125,000

7. Total project costs: $2,452,500

8. Estimated annual water savings: 845.66 AF/year

9. Estimated total amount of water to be saved: 10,147.94 - Over 12 years

		$/AF
Total Program	**1**	**437**
Customer Perspective	**4.19**	**105**
Agency Perspective	**1.65**	**265**

10. Project life:	10/1/03 - 6/30/06
11. State Assembly Districts:	66, 73, 74, 75, 76, 78, 79
12. State Senate Districts:	36, 37, 38, 39, 40
13. Congressional District(s):	48, 49, 50, 51, 52
14. County:	San Diego
15. Do the actions in this application involve physical changes in land use, or potential future changes in land use?	No

A-2 Application Signature Page

By signing below, the official declares the following:

The truthfulness of all representations in the application,

The individual signing the form is authorized to submit the application on behalf of the applicant,

The individual signing the form read and understood the conflict of interest and confidentiality section and waives any and all rights to privacy and confidentiality of the application on behalf of the applicant, and

The applicant will comply with all terms and conditions identified in this Application Package if selected for funding.

See Attachment 1, Letter of Authorization.

_____	Ken Weinberg	_____
Signature	Director of Water Resources	Date

A-3 Application Checklist

Part A: Project Description, Organizational, Financial and Legal Information
____x___A-1 Urban Water Conservation Grant Application Cover Sheet
____x___A-2 Application Signature Page
____x___A-3 Application Checklist
____x___A-4 Description of Project
____x___A-5 Maps
____x___A-6 Statement of Work, Schedule
____x___A-7 Monitoring and Evaluation
____x___A-8 Qualifications of the Applicant and Cooperators
____x___A-9 Innovation
____x___A-10 Agency Authority
____x___A-11 Operations and Maintenance

Part B: Engineering and Hydrologic Feasibility
Not Applicable

Part C: Plan for Environmental Documentation and Permitting
_15301_C-1 CEQA/NEPA
___x____C-2 Permits, Easements, Licenses, Acquisitions, and Certifications
___x____C-3 Local Land Use Plans
___x____C-4 State and Local Statutes and Regulations

Part D: Need for Project and Community Involvement
___x____D-1 Need for Project
___x____D-2 Outreach, Community Involvement, Support, Opposition

Part E: Water Use Efficiency Improvements and Other Benefits
___x____E-1 Water Use Efficiency Improvements
___x____E-2 Other Project Benefits

Part F: Economic Justification, Benefits to Costs Analysis
___x____F-1 Net Water Savings
___x____F-2 Project Budget and Budget Justification
___x____F-3 Economic Efficiency
___x____Benefit/Cost Analysis Tables, Conservation Long Form

A-4 Description of Project

The Commercial Landscape Incentive Program (CLIP) will provide financial incentives to owners of commercial, industrial, institutional (CII) properties and common areas of multi-family sites to upgrade irrigation systems. Improved irrigation will enable the sites to become more efficient and to save water. **CLIP will provide $2,500 of incentive funding to 450 customers over three years for hardware such as matching heads, pressure regulators, pressure regulating valves and heads, and upgraded controllers.** This project will take place in the service area of the San Diego County Water Authority (Authority) and will be managed by the Professional Assistance for Landscape Management (PALM) for Authority member agencies and the City of San Diego's Commercial Landscape Programs.

Based upon the experience of over 1,500 landscape audits performed by the Authority's programs over the last 12 years, incentives are needed to spur irrigation equipment upgrades to improve irrigation efficiency. While the number of gross over-irrigators has declined steadily, distribution uniformity (DU), or how evenly the irrigation system applies water over the landscape, has remained a dismal 50%. Without good DU, water use cannot be reduced to efficient levels without harming the landscape.

If all 450 incentives are utilized, water savings of 10,147.94 acre-feet (AF) may be achieved over the ten-year service life of the irrigation parts. However, the program has benefits other than water savings:

- Lower cost – Water saved via this program will cost only $437/AF from the total program perspective.
- Reduces demand on Metropolitan Water District of Southern California's (Metropolitan) imported water supplies.
- Reduces summer peaking demand on treatment plants and pipeline capacity.
- Reduces demand on the Colorado River, assisting California living within its 4.4 million acre-feet (maf) allocation.
- Reduces demand on the State Water Project, particularly during the warmer summer and fall months when anadromous fish are migrating and Bay-Delta water quality declines.
- Reduces polluted urban run-off into streams, ocean and groundwater basins.
- Reduces green waste into impacted urban landfills.
- Reduces energy needed to import, pump and treat water.
- Increased irrigation efficiency, which enables site managers to take advantage of new technologies such as Eto (evapotranspiration) irrigation timers.

Program operation will be quite simple. The PALM and City of San Diego Commercial Landscape Programs specifically target inefficient CII and multi-family customers. Based upon the findings of the landscape audits, a customer will be encouraged to apply for up to $2,500 of incentive funds for irrigation hardware needed to improve irrigation efficiency. The customer will be required to provide an equal amount of funding for irrigation hardware. Upon completion of installation, the customer will call

for an inspection, provide contractor receipts for all hardware, and demonstrate to the auditor that the system is working efficiently. The PALM program contractor will then issue the incentive check.

One of the most important elements of the program will be the requirement for member agencies to implement BMP 5 water budgets for participating customers. The high staffing requirement for BMP 5 water budgets and political sensitivities have deterred many agencies from implementation. The last four years of local drought, as well as an uncertain and expensive water future, have improved receptivity to water budgets by water districts, landscapers and their mutual customers. Member agencies have indicated that they are willing to implement voluntary water budgets for incentive customers.

Matching funding from the customer, water budgets from member agencies, and the opportunity to provide competitive service for landscapers bring together the three entities needed to accomplish landscape water conservation.

A-5 San Diego County Water Authority and Member Agencies Map

A-6 Statement of Work, Schedule

The CLIP program may be readily accomplished with the existing PALM and City of San Diego's Commercial Landscape programs, thus allowing a rapid start-up and disbursement of all program funds each fiscal year. Member agencies will be prepared to issue water budgets to participating customers by this time.

Date	Tasks	Incentives Issued	Project Costs		
			Prop 13	Agencies	Customer Matching
May - 03	Contract negotiation with			excluding	
	program partners			salaries	
	Preparatory work				
	Outreach				
Oct - 03	Contracts signed				
	Program commences				
Apr - 04	Quarterly report, invoice	45	112,500	20,250	112,500
Jul - 04	Quarterly report, invoice	45	112,500	20,250	112,500
Oct - 04	Quarterly report, invoice	45	112,500	20,250	112,500
Jan - 05	Quarterly report, invoice	45	112,500	20,250	112,500
Apr - 05	Quarterly report, invoice	45	112,500	20,250	112,500
Jul - 05	Quarterly report, invoice	45	112,500	20,250	112,500
Oct - 05	Quarterly report, invoice	45	112,500	20,250	112,500
Jan - 06	Quarterly report, invoice	45	112,500	20,250	112,500
Apr - 06	Quarterly report, invoice	45	112,500	20,250	112,500
Jul - 06	Quarterly report, invoice	45	112,500	20,250	112,500
Aug - 06	Final Report	450	$1,125,000	$202,500	$1,125,000

A-7 Monitoring and Evaluation

Water agencies have been reluctant to engage in landscape incentive programs due to the behavioral element of irrigation savings. An even greater concern of water agencies is the risk of fraud in a setting where the site owner is disconnected from landscape operations. This program will be developed to minimize these risks as much as possible with monitoring and evaluation at several levels in the CLIP program.

Program Operators
PALM, operated by VIEWtech, Inc., and the City of San Diego's Commercial Landscape Programs provide monthly reports and invoices of all activities that will be used to assess the need for program improvements. The Authority has long maintained a strong working relationship with both contractors via phone, e-mail, and inspection ride-alongs that benefit our mutual customers. Both contractors have upstanding reputations with the community; and neither has any direct economic interest in irrigation installations.

Internal Review
All invoices are reviewed at several levels within the Authority to ensure accuracy and contract compliance before payments are issued.

Quality Control
The Authority has a vigorous quality control (QC) program conducted by staff members not associated with the conservation programs. QC checks consist of ride-alongs with the contractor, detailed review of program paper work and finances, customer satisfaction post cards, and phone calls. Member agency Conservation Coordinators are also strongly encouraged to participate in ride-alongs to observe program operation.

Site Inspection
Site inspection to receive the incentive will consist of verification that the proposed hardware has been installed and is operating efficiently. The customer must provide contractor receipts for hardware equal to the value of the incentive plus the customer's matching share. By limiting the incentive to irrigation hardware listed as needed in audits performed by the Authority's contractors, the possibility of misuse is decreased.

Water Savings Assessment
Member agencies must verify that an incentive customer is enrolled in a water budget program. On an annual basis, member agencies will be requested to provide water use records of CLIP customers to determine water savings.

Future Research
Many questions remain unanswered about water use and water budgets in the landscape. When BMP 5 was amended to include water budgets, savings projections were based on analysis of agencies with water budgets linked to a penalty rate structure. However, penalty rate structures are not a requirement of BMP 5. At this

time, there are no studies of water savings at agencies with voluntary water budgets. When a sufficient number of customers have been enrolled in a water budget program, funding will be sought to determine water savings, budget compliance and the impact of such measures as audits, incentives and Eto timers.

Program Records

All program information is maintained in both paper and electronic forms in accordance with the Authority's Records Retention Policy. Additionally, the Authority is governed by and complies with the Public Information Act.

A-8 Qualifications of the Applicant and Cooperators

Program Manager

Ms. Vickie V. Driver will serve as program manager of the CLIP program. She has 12 years of experience in conservation program design and management. Currently, she oversees the PALM and Agricultural Water Management Programs as well as Xeriscape and irrigation training programs. In the past, she also managed the CII Voucher Incentive Program and the Residential Survey Program. The long-standing relationship between Ms. Driver and the program contractors is one of mutual respect that fosters a vigorous exchange of ideas. See Attachment 2-a for resume.

External Cooperators

Mr. John Smekal of VIEWtech, Inc. operates the PALM program under contract to the Authority. He has over 10 years of experience in the field and in management of landscape and incentive-based conservation programs. His experience in energy conservation programs gives him a breadth of understanding in utility conservation efforts. Member agencies enjoy a strong working relationship with Mr. Smekal and VIEWtech, Inc. See Attachment 2-b for resume.

Mr. Daniel R. Carney is a registered landscape architect who currently is the manager of the City of San Diego landscape conservation programs. His understanding of landscapes and the needs of customers and utilities led to the development of the Landscape Calculator, a web-based tool that enables non-landscapers to develop irrigation schedules. He was also the creative force behind WRLD, Water Resources Landscape Database, a program that uses aerial photography, computer technology and the Landscape Calculator to develop water budgets. Mr. Carney has over 12 years of experience in the field and in management of landscape conservation programs for water agencies. See Attachment 2-c for resume.

A-9 Innovation

The most innovative approach of the CLIP program is linking a landscape audit program to an irrigation hardware incentive program and to a water budget program. Site owners have been reluctant to implement the recommendations of a landscape audit due to the high cost of quality hardware. An irrigation hardware incentive program will provide the landscape contractor the equipment to efficiently manage a site. Landscape water budgets will provide water use guidelines to both the site owner and landscape contractor and will yield the water savings needed by the water utility. Linking landscape audits, irrigation hardware incentives, and water budgets are an innovation that serves the mutual, best interests of site owners, landscape contractors and water agencies.

A-10 Agency Authority

1. Does the applicant (official signing A-2, Application Signature Page) have the legal authority to submit an application and to enter into a funding contract with the State?

   Yes.

2. What is the legal authority under which the applicant was formed and is authorized to operate?

   The Authority operates under the authorization of the State of California.

3. Is the applicant required to hold an election before entering into a funding contract with the State?

   No.

4. Will the funding agreement between the applicant and the State be subject to review and/or approval by other government agencies? If yes, identify all such agencies.

   Authority staff will request approval from the Board of Directors to execute the agreement.

5. Is there any pending litigation that may impact the financial condition of the applicant, the operation of the water facilities, or its ability to complete the proposed project? If none is pending, so state.

   There is no pending litigation for the Authority.

A – 11 Operations and Maintenance

Not applicable as this is a non-construction project.

Part B
Engineering and Hydrologic Feasibility

Not applicable as this is a non-construction project.

Part C
Plan for Completion of Environmental Documentation

C – 1 California Environmental Quality Act and National Environmental Policy Act
C – 2 Permits, Easements, Licenses, Acquisitions, and Certificates
C – 3 Local Land Use Plans
C – 4 Applicable Legal Requirements

In accordance with the California Environmental Quality Act (CEQA), it has been determined that the proposed project is Categorically Exempt from further CEQA review. See Attachment 3 – Notice of Exemption.

Part D
Need for Project and Community Involvement

D – 1 Need for the Project

Water conservation is the lowest cost source of new water for the San Diego region. Landscape is a particularly abundant supply source but it is also one of the most difficult to achieve because of the behavioral element and the continuing need for diligent maintenance. Customers participating in landscape audit programs frequently express the need for funding assistance to implement audit recommendations. The needed changes and savings are unlikely to occur without the catalyst of incentives. An irrigation hardware incentive program linked to landscape audits and to water budgets brings together all the elements needed to save water and satisfy a number of needs:

- Low cost water! The CLIP Program will provide a reliable source of water at $437/AF from the perspective of all participants.
- Provides incentives to site owners who cannot justify the cost of efficiency improvements solely on the basis of their water bills.
- Reduces the region's dependence on expensive and uncertain imported water supplies. Up to 90% of San Diego's water is imported.
- Reduces or defers the need for capital improvements by reducing summer peaking demand on treatment plants and pipeline capacity.
- Reduces the demand on the Colorado River, assisting California in living within the State's 4.4 million acre-feet (MAF) allocation.
- Reduces demand on the State Water Project (Bay-Delta), particularly when water supplies and quality decline just as some species of fish are migrating in the late summer and early fall. Most landscape over irrigation occurs in this time frame. About one-quarter of the region's water supply is taken from the State Water Project to keep total dissolved solids (TDS) below 500 PPM (parts per million).
- Enables the Authority and member agencies to meet the requirements of the Memorandum of Understanding Regarding Urban Water Conservation, BMP 5, Large Landscapes; Authority and member agency Urban Water Management Plans; and the regional Agricultural Water Management Plan.
- Protects our vigorous economy, especially the tourist industry that depends upon beautiful landscapes to attract visitors.

D – 2 Outreach, Community Involvement, Support, Opposition

Much community outreach has already taken place. Indeed, the CLIP program idea grew out of discussions with CLCA (California Landscape Contractors Association) members, PALM and the City of San Diego Commercial Landscape Program contractors and member agencies. Additionally, colleagues in storm water management programs have strongly pressed for landscape incentives and water budgets as a way to reduce polluted urban run-off. Fellow public servants in the solid waste management arena have long lobbied for landscape water use efficiency as a way to reduce green waste flowing into over-burdened urban landfills. Trade and professional groups associated with property management are eager for ways to manage water costs and still maintain attractive landscapes vital to the economic value of their properties. All realize the need for a combined effort to provide incentives for improvements in landscape irrigation efficiency and to implement supporting water budgets.

Water agencies have been reluctant to implement landscape water budgets because of the high staffing requirements, technical issues and political sensitivities. The City of San Diego's generous offer to share aerial measurement and water budget technology has overcome major technical issues. Four years of drought, the uncertainties of imported water availability, and summer peaking issues have improved receptivity to water budgets among our member agencies – as long as the water budgets are voluntary. A major change of events could make even mandatory water budgets feasible.

All project partners will continue to work together to conduct a program that meets our mutual best interests. Letters of Support will follow.

Part E
Water Use Efficiency Improvements and Other Benefits

E – 1 Water Use Efficiency Improvements

Twelve years of experience with landscape audit programs indicated that only about one-quarter of the potential water savings were being realized. Discussions with program participants and landscape contractors revealed a need for incentives for irrigation hardware to make system improvements before water could be saved without damage to the plant material. Other discussions with conservation coordinators in agencies installing Eto irrigation timers indicated that frequently, major, irrigation hardware improvements were required before the new timers could work effectively. Additionally, member agencies could not realistically institute water budgets without providing some form of assistance to enable customers to become more efficient.

Standard industry formulas to determine water usage in landscapes and site characteristics taken directly from PALM annual reports are used to calculate all savings scenarios in this proposal. Note that potential PALM customers are pre-screened to service primarily over-users as a way to enhance program cost-effectiveness. Typical among pre-screened PALM program participants is a commercial site of one-acre with 50% cool season grass and 50% low water-use ground cover, a distribution uniformity of 50%, which applies water at 120% Eto in a region with an average reference evapotranspiration of 48". AB 325, the Model Water Efficient Landscape Ordinance, considers a DU of 62.5% to be a minimal acceptable level. See Section F – 1 Net Water Savings for calculations used to develop the savings figures shown below.

Controlling for DU and Eto, disaggregated calculations yield water savings of 1.04 AF/acre/year from improved DU, and 0.83 AF/acre/year from improved scheduling, for a total of 1.87 AF/acre/year. About 55.6% of water savings come from improved DU and 44.4% comes from improved scheduling. Clearly, irrigation hardware must be repaired and upgraded before significant savings may be achieved by water budgets or Eto timers.

Of course, real landscapes are not irrigated this way. Aggregated calculations for pre- and post-retrofit and schedule improvements show that a typical commercial site can save 3.52 AF/acre/year or 26 gallons per square foot. Given that most landscape irrigation hardware has a useful life of about 10 years, and allowing for only 80% of savings and a 5% deterioration in a voluntary water budget setting, a reasonable savings per site is estimated to be **2.81 AF/year** or **20.78 AF/site lifetime savings**.

If all 450 incentives over three years were issued as proposed, then average water savings of **845.66 AF/year** over twelve years could be produced for a total program savings of **10,147.94 AF**.

E – 2 Other Project Benefits

Project benefits accrue from several arenas: water supply, reliability, quality, and cost as well as energy, environmental, economic and quality of life. Each topic will be discussed here.

Water Supply and Reliability

Completion of this project as proposed will yield 10,147.94 AF of savings over the life of the devices. Supply and reliability are improved in equal proportion to the savings yielded. Even more important is the cost-effectiveness of conserved water from this project at a cost of $437/AF from the total program perspective. By comparison, the avoided cost of water is $500.52 – Authority, $564.49 – Member Agencies, and $653.40 from the customer's perspective.

Bay-Delta Benefits

The San Diego region uses about 650,000 AF/year, about 90% imported. About 25% of imported water come from the State Water Project that draws water from the Bay-Delta area. This one project is estimated to save 845.66 AF/year or 0.6% of our total annual demand on the Bay-Delta. Of even greater importance is that much of the savings will take place in late summer and early fall when days are still warm but growing shorter. Plants need less water at this time, but their human caretakers continue to water them on summer schedules until the first rains fall or weather becomes suddenly cooler. At this time, natural flows into the Bay-Delta decrease causing a decline in water quality and quantity as fish begin their migratory journey. Water conserved in San Diego reduces demands on the Bay-Delta and reduces stresses on the environment.

Energy

DWR research states that it takes 2,300 kWh to pump an acre-foot of water to the San Diego region. Water savings of 845.66 AF/year will save 1.9 million kWh/year with the actual dollar value depending upon the current contract rate per kWh. Additional energy savings accrue from the avoided cost of treating water to potable standards. Even though most water in the San Diego region is delivered by gravity flow, areas on the eastern fringe of the service area must pump up to elevation at a cost to the customer of up to $1.00 more per hundred cubic feet.

Urban Run-Off

Studies are underway now in Orange County to quantify the reduction in the volume of water and pollutants that may be achieved by efficient irrigation. It is intuitive that efficient irrigation will reduce urban run-off and contaminants; the only question is how much and at what price. Given the large expanses of landscaped slopes in San Diego and our heavy clay soils, the reductions are likely to be significant. For now in the San Diego region, irrigation water is exempt from storm water run-off penalties unless the run-off proves to be contaminated. However, this exemption is expected to change in the near future as more blatant sources of contamination such as sewer breaks and construction are brought under control. Efficient irrigation also has the benefit of

keeping expensive and sometimes hazardous landscape chemicals in the landscape and not washing them into the environment.

Green Waste Reduction

Green waste into urban landfills varies greatly by region. At the City of San Diego's Miramar Landfill, about 90,000 tons or 20% of the total is green waste. An unknown quantity of that is caused by over-irrigation, stimulating excessive growth that must be trimmed and then disposed. Like urban run-off, the relationship between reduced irrigation and reduced green waste is intuitive but not well documented. However, as any homeowner or landscape contractor taking a truckload of trimmings to the dump knows, every load is charged a fee.

Economic Benefits

Tourism is one of the top three industries in San Diego County. Two of the reasons visitors come to the area (and sometimes stay) are our beautiful landscapes and mild climate. Our mild Mediterranean temperatures belie the fact that we live in an area with an average of less than 10 inches of rain per year and a median rainfall of only seven to eight inches per year. Geographers call such areas deserts. The attraction of an oasis in the desert is universal as our tourism industry continues to survive in the wake of the 9/11 tragedy.

Attractive landscapes add to our quality of life not only with beauty but in economic value as well. Realtors estimate that an attractive landscape can add up to 10% more to the value of a property.

The CLCA was unable to provide a dollar figure that landscape contracting contributes to the local economy, but the San Diego chapter alone has 650 members, most of whom operate a small business with a few employees. The devastating impact of drought in Colorado this summer warned local landscape contractors of their vulnerability. The local landscape community strongly supports landscape incentives and water budgets as a way to survive in an area with uncertain water supplies.

Part F
Economic Justification: Benefits to Costs

F – 1 Net Water Savings

An irrigation hardware incentive program linked to landscape audits and water budgets brings together all the elements needed to save water. Field observations, customer and member agency comments and the results of a limited analysis of Authority audit customers in 1996, confirm the need for irrigation hardware incentives. It is unlikely that significant landscape savings will be realized without the catalyst of hardware incentives linked to water budgets and audits.

Prop 13 funding will provide one-half of the funding for irrigation hardware incentives with the other half coming from the customer in the form of matching funding. The Authority, and member agencies and Metropolitan will provide funding for all administrative costs via the existing PALM program and the City of San Diego's Commercial Landscape Program.

Landscape water savings are difficult to determine. Few studies have been conducted and the many variables make it difficult to apply the figures directly to this proposed project. Savings estimates were calculated by comparing pre- and post-retrofit site conditions using standard landscape formulas and site characteristics taken directly from PALM annual reports. Note that PALM customers are pre-screened to service primarily over-users as a way to enhance program cost-effectiveness. These customers will be the focus of the incentive program.

Typical among pre-screened PALM program participants is a small commercial or multi-family site with 50% cool season grass and 50% low water-use ground cover, a distribution uniformity of 50%, and water use at 120% Eto. Auditors often observe that ground covers are irrigated on the same schedule as turf, so a cool season grass Kc of 0.8 (crop coefficient) is used for the pre-retrofit scenario. For ease of calculations, a once acre site is used. A reference Eto of 48" is used to represent the average in the Authority service area. The post retrofit scenario uses a DU of 62.5 from AB 325 guidelines and a 0.65 Kc which is an average of cool season grass Kc of 0.8 and low water use ground cover of 0.5.

Pre Retrofit Water Use
43,560 sq. ft. x 48" Eto x 120% Eto x 0.8 Kc x 0.623"/gal / 0.5 DU = 2,501,027 gal

Post Retrofit Water Use
43,560 sq. ft. x 48" Eto x 100% Eto x 0.65 Kc x 0.623"/gal / 0.625 DU = 1,354,723 gal

Savings
2,501,027 gal - 1,354,723 gal = 646,099.7 / 325851 gal/AF = **3.52 AF/acre/year**

It is unlikely that this savings rate will be maintained perfectly for the 10-year life of the retrofitted irrigation devices. However, under voluntary water budgets with follow-up by the water district Conservation Coordinator and increasing pressure to eliminate urban run-off, 80% of savings with a 5% annual deterioration rate is estimated. Under these conditions, savings per site are estimated to be **2.81 AF/year** or **20.78 AF/lifetime**. If all 450 sites over three years were retrofitted, then average annual savings of **845.66 AF** could be realized with a total program savings of **10,147.94 AF**. This is the scenario used for the budget and Benefit/Cost calculations.

Recently, summer peaking problems, urban run-off issues, increased water costs and the uncertainty of imported water availability have forced some agencies to consider mandatory water budgets. Under this 'perfect storm' scenario, savings would be much higher, as would the costs to implement them. If landscape irrigation only customers were held to a mandatory BMP 5 water budget with no savings deterioration, then a savings of **3.52 AF/acre/year** could be expected with a lifetime savings of **29.43 AF/site**. This scenario would be expected only under the most drastic of water events.

All Benefit/Costs analysis is shown from the Total Program Perspective as it is critical to have full participation from all partners to successfully save water in the landscape. However, B/C tables from the Customer, and Agency perspectives are included in Attachment 4 – Benefit/Cost Analysis. Additionally, B/C tables for a mandatory water budget program are included in the same Attachment.

F – 2 Project Budget and Budget Justification

Table 2: Total Program Capital Costs for Three Years
Water Conservation Projects

	Capital Cost Category (a)	Cost (b)	Contingency Percent (c)	Contingency $ (d) (bxc)	Subtotal (e) (b+d)
(a)	Land Purchase/Easement	0	0	0	0
(b)	Planning/Design/Engineering	0	0	0	0
(c)	Materials/Installation	1,125,000	0	0	1,125,000
(d)	Structures	0	0	0	0
(e)	Equipment Purchases/Rentals	1,125,000	0	0	1,125,000
(f)	Environmental Mitigation/Enhancement	0	0	0	0
(g)	Construction Administration/Overhead	202,500	0	0	202,500
(h)	Project Legal/License Fees	0	0	0	
(k)	Total (1) (a + ... + i)				2,452,500

All items are for 450 over three years. The following components are included in the table above:

- Materials/Installation includes customer matching of $2,500 per site that may be applied to irrigation hardware only. Landscape contractor labor is not included as simple head retrofit is a part of most landscape maintenance agreements. However, additional labor may be required.
- Equipment Purchases/Rentals consists of $2,500/site, paid as a rebate from Proposition 13 funds. An incentive amount of $2,500 plus customer matching of $2,500 is used as that is the approximate costs of hardware for the most frequently recommended retrofits of a typical site in the audit program.
- Construction Administration is a total of $450 per site that includes payment to the contractor to issue the incentive check and perform a detailed installation verification.

Table 5: Total Program Project Costs (Long Form)
Water Conservation Projects

Year (a)	Discount Factor (6.0%) (b)	Capital Costs (c)	Operation/ Maintenance Costs (d)	Total Costs (e) (c+d)	Total Discounted Costs (f) (bxe)
0	1.000	817,500	510,979	1,328,479	1,328,479
1	0.943	817,500	510,979	1,328,479	1,252,756
2	0.890	817,500	510,979	1,328,479	1,182,346
3	0.840	-----	121,194	121,194	101,803
4	0.792	-----	121,194	121,194	95,986
5	0.747	-----	121,194	121,194	90,532
6	0.705	-----	121,194	121,194	85,442
7	0.665	-----	121,194	121,194	80,594
8	0.627	-----	121,194	121,194	75,989
9	0.592	-----	121,194	121,194	71,747
10	0.558	-----	121,194	121,194	67,626
11	0.526	-----	121,194	121,194	63,748
12	0.497	-----	121,194	121,194	60,233
TOTAL		**2,452,500**	**2,502,489**	**4,954,989**	**4,433,299**

The following items are included in the table above:

- Capital Costs as shown in Table 2.
- Operations and Maintenance includes Authority and Member Agency staff time.
- In Years 1 – 3, Authority staff time consists of 520 hours of Water Resources Specialist time and 25 –50 hours each of quality control, clerical and management.
- In Years 1 – 3, Member Agency staff time includes five FTE's Conservation Coordinator time and 25 hours of clerical support. This represents the estimated level of effort required to implement water budget programs to support the incentive program. Based upon observations of agencies that implemented water budget programs, a generous level of staff time was allotted.
- In Years 4 – 14, the equivalent of five, one-quarter time (520 hours) of Conservation Coordinator time and 25 hours of clerical support are included. As indoor devices become saturated, Conservation Coordinators will be able to redirect time to landscape programs.
- A time frame of 12 years is used as irrigation hardware has a useful life of 10 years and devices will be installed over three years.

F – 3 Economic Efficiency

The most readily quantifiable benefit of the CLIP program is the water savings which results in reduced demand on existing and future supplies. Table 6 below displays the project benefits calculations.

Table 6: Total Program Project Benefits (Long Form)

Water Conservation Projects

Year (a)	Water Conservation Savings - AF (b-1) Year 1	Water Conservation Savings - AF (b-2) Year 2	Water Conservation Savings - AF (b-3) Year 3	Discount Factor (6.0%) (c)	Water Supply Benefits(1) (d)	Total Discounted Benefits (e) (bxcxd)
0						0
1	422			1.000	653	259,710
2	400	422		0.943	653	477,971
3	380	400	422	0.890	653	659,905
4	361	380	400	0.840	653	591,087
5	343	361	380	0.792	653	529,627
6	326	343	361	0.747	653	474,856
7	310	326	343	0.705	653	425,518
8	294	310	326	0.665	653	381,143
9	280	294	310	0.627	653	341,874
10	266	280	294	0.592	653	305,293
11		266	280	0.556	653	186,257
12			266	0.523	653	86,214
				0.497		
TOTAL	**3,383**	**3,383**	**3,383**			**4,446,984**

(1) Total avoided costs, alternative costs or revenue benefits.
(2) Average annual AF/year savings = 845.66
(3) Total Program Savings = 10147.94
(b) Savings calculations assume a commercial customer with one acre of irrigated landscape with 50% cool season turf with a Kc of 0.8 and 50% ground cover with a Kc of 0.5, DU of .625.
Avererage reference evapotranspiration for the region is 48"
Savings = 2.81AF/site in first year.
Assume 80% of calculated savings with a 5% annual decline.

The avoided cost of the current supply is shown in Table 4 – a. below. The avoided cost of Metropolitan supply is the weighted mean of treated and untreated water in Metropolitan's new rate sructure. See Attachment 5 for Metropolitan's new rate structure.

The avoided cost of the Authority supply is the transportation charge, $55, of the Authority's new rate structure.

The Member Agency portion of avoided cost was calculated by taking the average, member agency commercial rate in the region, $1.50/hcf applied to an AF, and deducting Metropolitan's and the Authority's charges. Member agencies' fixed and variable portions vary widely throughout the service area. However, discussions with Authority operations engineers who are familiar with member agency operations, gave 50% as a safe figure to assume as the variable portion with the Member Agency increment estimated to be $64.38.

The customer avoided cost is simply the sum of the increments.

Table 4 – b was not used as future supply sources will be developed in addition to this project. Table 4 – c was not calculated either as water savings from this program is reduced demand, not water that may be resold.

Table 4: Total Program Water Supply Benefits

Water Conservation Projects

(1997 Dollars)

4a. Avoided Cost of Current Supply Sources

Sources of Supply (a)	Cost of Water $/AF (b)
MWDSC	445.52
SDCWA	55
Member Agency	64.38
Customer Increment	88.5
Customer Savings	653.4

Benefit/Cost Ratio and other summary data are shown in Table 7. Below.

Table 7: Total Program Benefit/Cost Ratio
Water Conservation Projects

Project Benefits ($)(1)	4,446,984
Project Costs ($)(2)	4,433,299
Benefit/Cost Ratio	1.00
Nets Savings	13,685.67
$/AF	436.87

(1) From Table 6: Project Benefits
(2) From Table 5: Project Costs

THE CITY OF SAN DIEGO

FACT SHEET
Water Conservation Program

WHO ARE WE?
In 1985 the San Diego City Council officially established the City's Water Conservation Program, to reduce San Diego's dependency on imported water. Today, the Water Conservation Program accounts for more than 18,000 acre-feet (AF) of potable water savings per year. This savings has been achieved by creating a water conservation ethic, adopting policies and ordinances designed to promote water conservation practices, and implementing comprehensive public information and education campaigns.

WHY IS WATER CONSERVATION IMPORTANT?
The city of San Diego is located in a semi-arid coastal desert environment that averages only 9.3 inches of rainfall annually. Because of the limited rainfall, there are no reliable streams or natural lakes from which to draw water. San Diego imports most of its water by purchasing it from the San Diego County Water Authority (CWA) and the Metropolitan Water District (MWD) of Southern California. Only 10-20 percent of San Diego's water is of local origin, collected as runoff in the City's nine reservoirs.

HOW DOES IT WORK?
The Water Conservation Program reduces water demand through promoting or providing incentives for the installation of hardware that provides permanent water savings. It also provides services and information to help San Diegans make better decisions about water use in their homes, landscaping and businesses. These efforts increase water savings by providing a new source of potable water for an expanding San Diego.

In 1997, the Water Department committed to incrementally increase water savings to 26,000 AF per year by 2005. To date, the City of San Diego is on track to meet that goal.

The water conservation programs and services offered by the City are free for San Diego residents.

WATER CONSERVATION PROGRAMS AND SERVICES OFFERED:

Residential Water Survey Program
This in-home water-use survey provides a complete analysis of all interior and exterior water uses, checks for leaks, provides water saving devices (i.e. showerheads and faucet aerators), and offers water-efficient landscape and irrigation recommendations. To date, more than 30,000 residences have participated in the survey program, estimated to provide a savings of one million gallons per day.

Ultra-Low Flush Toilet Voucher Program
The Voucher Program promotes the incentive-based upgrade of existing fixtures to water-efficient models. Customers receive vouchers that reduce the cost of toilets that replace an existing one using at least 3.5 gallons per flush. The voucher program is estimated to provide 7.5 million gallons of water savings each day.

High-Efficiency Clothes Washer (HEW) Program
Similar to the toilet voucher program, the HEW program offers a discount toward the purchase of an approved high-efficiency washing machine. A high-efficiency machine uses 40 percent less water than the average washer, uses 55 percent less energy, and reduces drying time by half. A single machine can save approximately 5,100 gallons of water per year.

-more-

Commercial, Industrial, and Institutional Water Conservation Survey Program
This program offers cost-effective recommendations on how commercial, industrial and institutional customers can reduce water consumption without affecting processes or production levels. The implementation of these recommendations often yields a 20 percent water savings for each customer, and provides a water savings of mo than 524,700 gallons per day for the City.

California Irrigation Management Information System (CIMIS)
CIMIS stations gather weather data that is used to provide information on how to efficiently water plants. In conjunction with the California Department of Water Resources (DWR), City staff performs regular maintenanc for local CIMIS stations. CIMIS data accounts for an estimated 30,000 gallons of water savings per day.

Commercial Landscape Survey Program
This program provides customers with landscape water-use budgets based upon their property's irrigation syster plant types, and weather factors. Maintained by a computer application – the Water Resources Landscape Database (WRLD) – these budgets are currently being provided to City parks, freeway landscapes, and some commercial properties. This program targets property with more than one acre of irrigated landscape, and will save an estimated six million gallons per day over the next ten years.

Public Information and Outreach Program
The City provides its residents with a variety of information and educational materials available through a variet of media. Program staff actively participate in a speakers bureau, community activities, provide informational brochures and fact sheets, and work to increase awareness of water conservation programs, measures and successes.

Plumbing Retrofit upon Resale Ordinance Enforcement
Since February of 1992, the City has enforced Municipal Code changes that require plumbing to be retrofitted to water-efficient models upon resale of the property. To date, more than 70,000 certificates demonstrating compliance have been filed.

Landscape Watering Calculator
Located on line, the Landscape Watering Calculator is an easy-to-use tool that provides customers with an estimation of the water needed for their landscape. Available 24-hours a day, the calculator accounts for water savings of more than 281,000 gallons per day. (www.sandiego.gov/water/conservation)

Water Conservation Garden on the Campus of Cuyamaca College
In an effort to illustrate a beautiful and water-efficient garden, the City co-sponsors the Water Conservation Garden on the campus of Cuyamaca College. The garden serves as a learning resource center with beautiful, healthy gardens, an amphitheater, multiple educational exhibits, more than 360 trees, and 100,000 square feet of water-efficient landscaping well-suited to San Diego's climate.

CONTACT
Luis Generoso, Water Resources Manager, City of San Diego Water Department, 600 B Street, MS-912, San Diego, CA 92101; Tel: (619) 533-5258, Email: lgeneroso@sandiego.gov

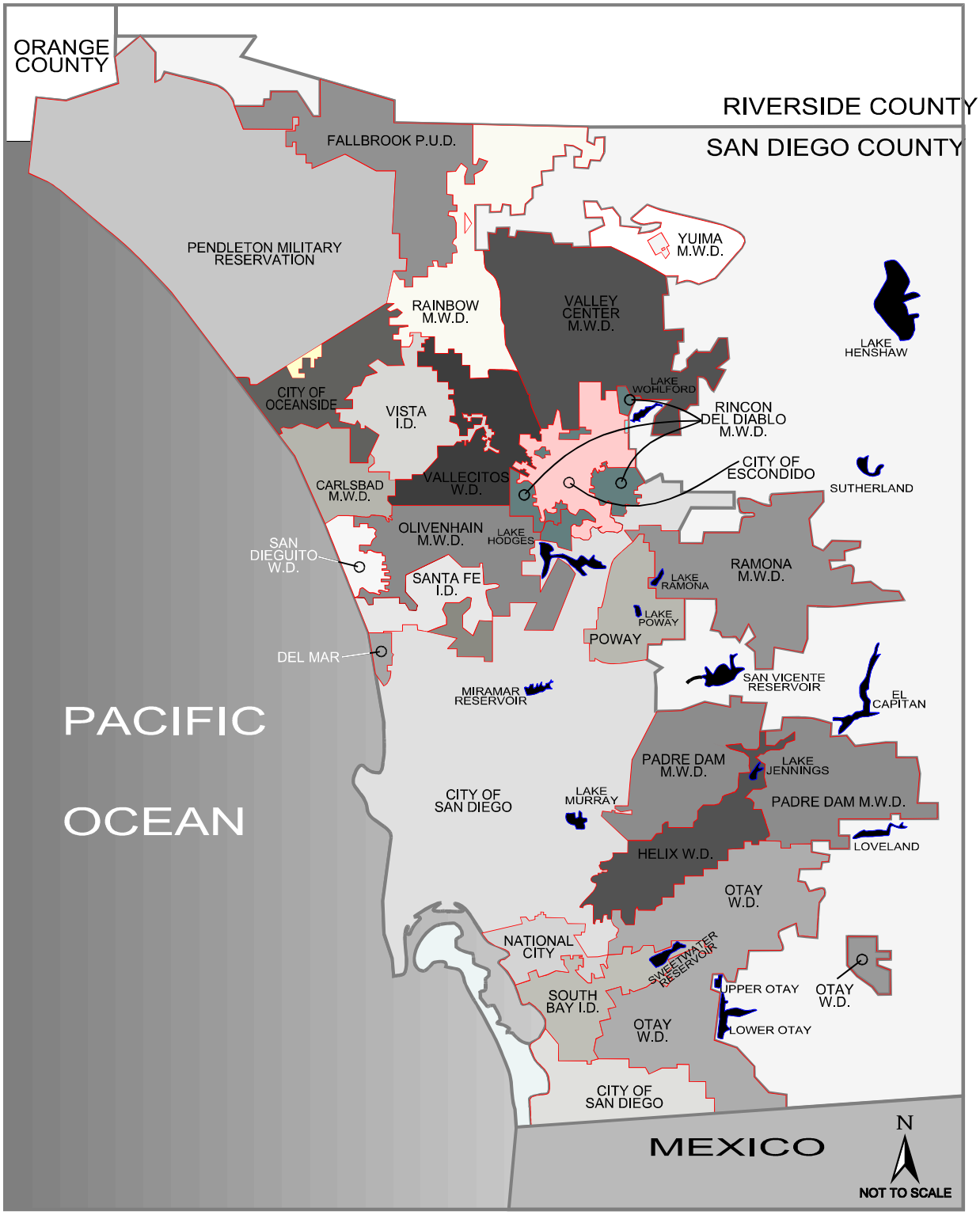
ORANGE COUNTY
RIVERSIDE COUNTY
SAN DIEGO COUNTY
FALLBROOK P.U.D.
PENDLETON MILITARY RESERVATION
YUIMA M.W.D.
RAINBOW M.W.D.
VALLEY CENTER M.W.D.
LAKE HENSHAW
LAKE WOHLFORD
CITY OF OCEANSIDE
VISTA I.D.
RINCON DEL DIABLO M.W.D.
CITY OF ESCONDIDO
SUTHERLAND
CARLSBAD M.W.D.
VALLECITOS W.D.
OLIVENHAIN M.W.D.
LAKE HODGES
SAN DIEGUITO W.D.
SANTA FE I.D.
RAMONA M.W.D.
LAKE RAMONA
LAKE POWAY
POWAY
DEL MAR
SAN VICENTE RESERVOIR
EL CAPITAN
MIRAMAR RESERVOIR
PACIFIC
OCEAN
PADRE DAM M.W.D.
LAKE JENNINGS
CITY OF SAN DIEGO
LAKE MURRAY
PADRE DAM M.W.D.
LOVELAND
HELIX W.D.
OTAY W.D.
NATIONAL CITY
SWEETWATER RESERVOIR
SOUTH BAY I.D.
UPPER OTAY
OTAY W.D.
OTAY W.D.
LOWER OTAY
CITY OF SAN DIEGO
MEXICO
N
NOT TO SCALE

Table 1: Project Performance
Water Conservation Projects

Average Annual Water Savings (A 845.66

From Table 6, (2)

Table 6: Total Program Project Benefits (Long Form)
Water Conservation Projects

Year (a)	Water Conservation Savings - AF (b-1) Year 1	Water Conservation Savings - AF (b-2) Year 2	Water Conservation Savings - AF (b-3) Year 3	Discount Factor (6.0%) (c)	Water Supply Benefits(1) (d)	Total Discounted Benefits (e) (bxcxd)
0						0
1	422			1.000	653	259,710
2	400	422		0.943	653	477,971
3	380	400	422	0.890	653	659,905
4	361	380	400	0.840	653	591,087
5	343	361	380	0.792	653	529,627
6	326	343	361	0.747	653	474,856
7	310	326	343	0.705	653	425,518
8	294	310	326	0.665	653	381,143
9	280	294	310	0.627	653	341,874
10	266	280	294	0.592	653	305,293
11		266	280	0.556	653	186,257
12			266	0.523	653	86,214
				0.497		
TOTAL	**3,383**	**3,383**	**3,383**			**4,446,984**

(1) Total avoided costs, alternative costs or revenue benefits.
(2) Average annual AF/year savings = 845.66
(3) Total Program Savings = 10147.94
(b) Savings calculations assume a commercial customer with one acre of irrigated landscape with 50% cool season turf with a Kc of 0.8 and 50% ground cover with a Kc of 0.5, DU of .625
Assume 80% of calculated savings with a 5% annual decline.
2.81 AF/site

Table 5: Total Program Project Costs (Long Form)
Water Conservation Projects

Year (a)	Discount Factor (6.0%) (b)	Capital Costs (c)	Operation/ Maintenance Costs (d)	Total Costs (e) (c+d)	Total Discounted Costs (f) (bxe)
0	1.000	817,500	510,979	1,328,479	1,328,479
1	0.943	817,500	510,979	1,328,479	1,252,756
2	0.890	817,500	510,979	1,328,479	1,182,346
3	0.840	-----	121,194	121,194	101,803
4	0.792	-----	121,194	121,194	95,986
5	0.747	-----	121,194	121,194	90,532
6	0.705	-----	121,194	121,194	85,442
7	0.665	-----	121,194	121,194	80,594
8	0.627	-----	121,194	121,194	75,989
9	0.592	-----	121,194	121,194	71,747
10	0.558	-----	121,194	121,194	67,626
11	0.526	-----	121,194	121,194	63,748
12	0.497	-----	121,194	121,194	60,233
TOTAL		**2,452,500**	**2,502,489**	**4,954,989**	**4,433,299**

(d) Includes incentive, customer matching and contractor administrative costs for one yea
See text for explanation of Operation/Maintenance Costs.

Table 4: Total Program Water Supply Benefits
Water Conservation Projects
(1997 Dollars)

4a. Avoided Costs of Current Supply Sources

Sources of Supply (a)	Cost of Water ($/AF) (b)
MWDSC	445.52
SDCWA	55
Member Agency	64.38
Customer Increment	88.5
Customer Savings	653.4

See text for explanation of avoided costs.

Table 3: Total Program Annual Operations and Maintenance Costs
Water Conservation Projects

Administration (a)	Operations (b)	Maintenance (c)	Other (d)	Total (e)
208,541	0	0	0	208,541

This figure is an average of SDCWA and Member Agency staff time over 12 years.

Table 2: Total Program Capital Costs for Three Years
Water Conservation Projects

	Capital Cost Category (a)	Cost (b)	Contingency Percent (c)	Contingency $ (d) (bxc)	Subtotal (e) (b+d)
(a)	Land Purchase/Easement	0	0	0	0
(b)	Planning/Design/Engineering	0	0	0	0
(c)	Materials/Installation	1,125,000	0	0	1,125,000
(d)	Structures	0	0	0	0
(e)	Equipment Purchases/Rentals	1,125,000	0	0	1,125,000
(f)	Environmental Mitigation/Enhancement	0	0	0	0
(g)	Construction Administration/Overhead	202,500	0	0	202,500
(h)	Project Legal/License Fees	0	0	0	
(k)	Total (1) (a + ... + i)				2,452,500

All items are for 150 devices a year for three years.
Materials/Installation represents customer matching of $2,500 per site for hardware only.
Equipment purchases represents incentive for irrigation hardware paid via an incentive from Pr
Construction Administration is the fee charged by the program consultant to issue the incentive
check and perform a thorough installation verification.

Table 7: Total Program Benefit/Cost Ratio
Water Conservation Projects

Project Benefits ($)(1)	4,446,984
Project Costs ($)(2)	4,433,299
Benefit/Cost Ratio	1.00
Nets Savings	13,685.67
$/AF	436.87

(1) From Table 6: Project Benefits
(2) From Table 5: Project Costs

Table 1: Project Performance

Water Conservation Projects

Agency Perspective

Average Annual Water Savings (AF) 845.66

From Table 6, (2)

Table 2: Agency Capital Costs for Three Years
Water Conservation Projects

	Capital Cost Category (a)	Cost (b)	Contingency Percent (c)	Contingency $ (d) (bxc)	Subtotal (e) (b+d)
(a)	Land Purchase/Easement	0	0	0	0
(b)	Planning/Design/Engineering	0	0	0	0
(c)	Materials/Installation	0	0	0	0
(d)	Structures	0	0	0	0
(e)	Equipment Purchases/rentals	0	0	0	0
(f)	Environmental Mitigation/Enhancem	0	0	0	0
(g)	Construction Administration/Overhea	202,500	0	0	202,500
(h)	Project Legal/License Fees	0	0	0	0
(k)	Total (1) (a + ... + i)				202,500

Table 3: Agency Annual Operations and Maintenance Costs
Water Conservation Projects

Administration (a)	Operations (b)	Maintenance (c)	Other (d)	Total (e)
208,541	0	0	0	208,541

Table 4: Agency Water Supply Benefits
Water Conservation Projects
(1997 Dollars)

4a. Avoided Costs of Current Supply Sources

Sources of Supply (a)	Cost of Water ($/AF) (b)
MWDSC	445.52
SDCWA	55
Member Agency	64.38
Agency Avoided Cost	564.9

Table 5: Agency Project Costs (Long Form)

Water Conservation Projects

Year (a)	Discount Factor (6.0%) (b)	Capital Costs (c)	Operation/ Maintenance Costs (d)	Total Costs (e) (c+d)	Total Discounted Costs (f) (bxe)
0	1.000	202,500	510,979	713,479	713,479
1	0.943	202,500	510,979	713,479	672,811
2	0.890	202,500	510,979	713,479	634,996
3	0.840		121,194	121,194	101,803
4	0.792		121,194	121,194	95,986
5	0.747		121,194	121,194	90,532
6	0.705		121,194	121,194	85,442
7	0.665		121,194	121,194	80,594
8	0.627		121,194	121,194	75,989
9	0.592		121,194	121,194	71,747
10	0.558		121,194	121,194	67,626
11	0.525		121,194	121,194	63,569
12	0.493		121,194	121,194	59,755
TOTAL		**607,500**	**2,502,489**	**3,109,989**	**2,691,004**

Table 6: Agency Project Benefits (Long Form)
Water Conservation Projects

Year (a)	Water Conservation Savings - AF (b-1) Year 1	Water Conservation Savings - AF (b-2) Year 2	Water Conservation Savings - AF (b-3) Year 3	Discount Factor (6.0%) (c)	Water Supply Benefits(1) (d)	Total Discounted Benefits (e) (bxcxd)
0						0
1	422			1.000	653	259,710
2	400	422		0.943	653	477,971
3	380	400	422	0.890	653	659,905
4	361	380	400	0.840	653	591,087
5	343	361	380	0.792	653	529,627
6	326	343	361	0.747	653	474,856
7	310	326	343	0.705	653	425,518
8	294	310	326	0.665	653	381,143
9	280	294	310	0.627	653	341,874
10	266	280	294	0.592	653	305,293
11		266	280	0.556	653	186,257
12			266	0.523	653	85,296
				0.492		
TOTAL	**3,383**	**3,383**	**3,383**			**4,446,984**

(1) Total avoided costs, alternative costs or revenue benefits.
(2) Average annual AF/year savings = 845.66
(3) Total Program Savings = 10147.94
(b) Savings calculations assume a commercial customer with one acre of irrigated landscape with 50% cool season turf with a Kc of 0.8 and 50% ground cover with a Kc of 0.5 per AB 325. site with a 5% annual deterioration rate.
2.81AF/site

Table 7: Agency Benefit/Cost Ratio
Water Conservation Projects

Project Benefits ($)(1)	4,446,984
Project Costs ($)(2)	2,691,004
Benefit/Cost Ratio	1.65
Net Savings	1,755,980.67
AF Savings	10,147.94
$/AF	$265

(1) From Table 6: Project Benefits
(2) From Table 5: Project Costs

Table 1: Project Performance

Water Conservation Projects

Customer Perspective

Average Annual Water Savings (AF) 845.66

From Table 6, (2)

Table 2: Customer Perspective - Capital Costs for Three Years
Water Conservation Projects

	Capital Cost Category	Cost	Contingency		Subtotal
			Percent	$	
	(a)	(b)	(c)	(d) (bxc)	(e) (b+d)
(a)	Land Purchase/Easement	0	0	0	0
(b)	Planning/Design/Engineering	0	0	0	0
(c)	Materials/Installation	1,125,000	0	0	1,125,000
(d)	Structures	0	0	0	0
(e)	Equipment Purchases/Rentals	0	0	0	0
(f)	Environmental Mitigation/Enhanceme	0	0	0	0
(g)	Construction Administration/Overhea	0	0	0	0
(h)	Project Legal/License Fees	0	0	0	0
(k)	Total (1) (a + ... + i)				1,125,000

Table 3: Annual Operations and Maintenance Costs

Water Conservation Projects

Customer Perspective

Administration (a)	Operations (b)	Maintenance (c)	Other (d)	Total (e)
0	0	0	0	0

No customer administration costs.
Customer landscape maintenance is included in existing agreement between site owner and landscape contractor. Installation of irrigation heads is a part of the usual maintenance agreement.

Table 4: Customer Perspective - Water Supply Benefits
Water Conservation Projects
(1997 Dollars)

4a. Avoided Costs of Current Supply Sources

Sources of Supply (a)	Cost of Water ($/AF) (b)
MWDSC	445.52
SDCWA	55
Member Agency	64.38
Customer Increment	88.5
Customer Savings	653.4

Table 4: Customer Perspective - Water Supply Benefits
Water Conservation Projects
(1997 Dollars)

4a. Avoided Costs of Current Supply Sources

Sources of Supply (a)	Cost of Water ($/AF) (b)
MWDSC	445.52
SDCWA	55
Member Agency	64.38
Customer Increment	88.5
Customer Savings	653.4

Table 5: Customer Perspective - Project Costs (Long Form)
Water Conservation Projects

Year (a)	Discount Factor (6.0%) (b)	Capital Costs (c)	Operation/ Maintenance Costs (d)	Total Costs (e) (c+d)	Total Discounted Costs (f) (bxe)
0	1.000	375,000		375,000	375,000
1	0.943	375,000		375,000	353,625
2	0.890	375,000		375,000	333,750
3	0.840			0	0
4	0.792			0	0
5	0.747			0	0
6	0.705			0	0
7	0.665			0	0
8	0.627			0	0
9	0.592			0	0
10	0.558			0	0
TOTAL		**1,125,000**	**0**	**1,125,000**	**1,062,375**

Table 6: Customer Perspective - Project Benefits (Long Form)
Water Conservation Projects

Year (a)	Water Conservation Savings - AF (b-1) Year 1	Water Conservation Savings - AF (b-2) Year 2	Water Conservation Savings - AF (b-3) Year 3	Discount Factor (6.0%) (c)	Water Supply Benefits(1) (d)	Total Discounted Benefits (e) (bxcxd)
0						0
1	422			1.000	653	259,710
2	400	422		0.943	653	477,971
3	380	400	422	0.890	653	659,905
4	361	380	400	0.840	653	591,087
5	343	361	380	0.792	653	529,627
6	326	343	361	0.747	653	474,856
7	310	326	343	0.705	653	425,518
8	294	310	326	0.665	653	381,143
9	280	294	310	0.627	653	341,874
10	266	280	294	0.592	653	305,293
11		266	280	0.556	653	186,257
12			266	0.523	653	85,296
				0.492		
TOTAL	**3,383**	**3,383**	**3,383**		**6,534**	**4,446,984**

(1) Total avoided costs, alternative costs or revenue benefits.
(2) Average annual AF/year savings = 845.66
(3) Total Program Savings = 10147.94

Table 7: Customer Perspective - Benefit/Cost Ratio

Water Conservation Projects

Project Benefits ($)(1)	4,446,984
Project Costs ($)(2)	1,062,375
Benefit/Cost Ratio	4.19
AF Savings	10,147.94

Net Savings $3,384,609

$/AF = $104.69

(1) From Table 6: Project Benefits
(2) From Table 5: Project Costs

Daniel R. Carney

City of San Diego Water Department
600 B Street Suite 1210
San Diego, CA 92101
Phone: (619) 533-7548
e-mail: dcarney@sandiego.gov

Registered Landscape Architect
Bachelor of Science, Landscape Architecture
Licensed Landscape Contractor
Certified Irrigation Auditor

Landscape Management Experience

Landscape Architect
City of San Diego Water Department
Supervisor: Luis Generoso (619) 533-5258
Dates of Employment: 1998–Present

Duties:

- Program design and project management responsibility for the City's landscape water conservation programs
- Subject matter advisor to Management
- Project coordination with regulatory and resource management agencies and City departments
- Educational presentations to schools, community and professional groups
- Design multi-media slideshows, publications, internet applications, and the Water Resources Landscape Database
- Prepare technical reports on wetland restoration, reclaimed water, and landscape best management practices
- Design and implement pilot research projects
- Utilize multiple computer applications including PowerPoint, ArcView, Microstation, and standard City software programs

Landscape Architect
Schmidt Design Group, Inc.
Supervisor: Glen Schmidt, ASLA (619) 236-1462
Dates of Employment: 1995–1997

Duties:

- Project design and administration for multi-acre park and recreation, commercial, and municipal projects

- Preparation of landscape construction drawings and specifications, cost estimates, bid documents and contracts
- Construction administration and inspection
- Coordination with multi-disciplinary design teams, government agencies, and contractors
- Development of specific plans for fire zone, brush management and revegetation projects
- Process regulatory agency approvals, and prepare resource management plans
- Write technical reports and develop educational materials
- Manage the Large Turf Water Management Program

Water Conservation Specialist
Irvine Ranch Water District
District Headquarters: (949) 453-5300
Dates of Employment: 1994–1995

Duties:
- Implemented District's landscape water management program
- Performed construction inspections to monitor program compliance
- Completed technical reports and provided customer support
- Processed capital improvement proposals, prepared consumption analysis reports, developed a mainframe data base program, and designed landscape improvements for District facilities

Additional Qualifications
- Instructor, Cuyamaca Community College Horticulture Department– Advanced Irrigation System Design
- Presenter, City of San Diego Water Department – Speakers Bureau

John Smekal

Professional Experience

Project Manager, VOLT VIEWtech Inc. – Responsible for management and administration of day-to-day operations for the San Diego office. Responsibilities include direct supervision of staff, quality control procedures, scheduling, invoicing, and distribution of rebates. On-going and recently concluded projects:

- **San Diego County Water Authority Residential Survey Program**
- **Municipal Water District of Orange County Toilet and Clothes Washer Rebate Programs**
- **American Water Company Clothes Washer Rebate Program**
- **San Diego County Water Authority PALM - Professional Assistance for Landscape Management Program**
- **San Diego Gas & Electric Persistence Study**
- **Los Angeles Water and Power Consumer Rebate Program**

Assistant Project Manager, VOLT VIEWtech Inc. **–** Trained and supervised a staff of field representatives assisting clients in demand side management water and energy projects. Instrumental in development of start-up operations, assisted with negotiations and administered subcontracts. Assists clients with development of survey instruments, data collection procedures, and reporting systems. Major projects have included:

- **City of San Diego ULFT Rebate Program**
- **California-American Water Co., CUWCC Best Management Practices**
- **San Diego County Water Authority ULFT Rebate Program**
- **SDG&E Title 24 Nonresidential New Construction Survey**
- **SDG&E Residential Energy End-Use Survey**

Marketing and Management Consultant - Provided short-term assistance to clientele with service businesses. Assisted clients in efforts to increase market share, sales, and profitability. Primary focus of consulting services was organizational efficiency and training with emphasis on customer service.

Operations Director, Navy Resale System - Managed merchandising operations for ten southern California stores with annual sales in excess of $150 million. Responsibilities included purchasing, distribution and mass merchandising.

Education

Bachelor of Science, Business Administration, Miami University, Oxford, Ohio
Certified Landscape Irrigation Auditor

VICKIE V. DRIVER

SKILLS AND QUALIFICATIONS

SKILLS AND EXPERIENCE

- Strong program and contract management skills
- Strong analytical skills
- Strong technical and life science background
- Computer literate in Word, Excel, Access
- Familiar with Urban and Agricultural MOUs, BMPs and other relevant local, state and federal regulations
- Familiar with public health and environmental issues
- Positive, proactive, “can-do” attitude

QUALIFICATIONS

- I currently manage landscape and agricultural conservation programs totaling $780,000 in value of services to member agencies. Additionally, I manage special projects for Xeriscape, irrigation training and several studies. In the past, I managed the Commercial, Industrial, Institutional (CII) Voucher Incentive Program and the Residential Survey Program.

- I have worked to make the conservation programs more cost-effective and more responsive to the needs of the member agencies and their customers.

- I researched and developed an incentive for coin-operated, H-axis clothes washers through the CII Voucher Incentive Program. I successfully submitted a proposal to SDG&E for $200,000 for coin-operated, H-axis vouchers.

- I have developed strong working relationships with member agencies, MWD staff, SDG&E, the military, the Department of Environmental Health, Storm Water Co-Permittees and contractors, California Landscape Contractors Association and the Farm Bureau.

- I represent the Authority on the California Urban Water Conservation Council’s (CUWCC) Landscape and Research and Evaluation sub-committees, MWD’s landscape committee and the Agricultural Water Management Council.

- I have willingly accepted additional assignments which were not directly job related such as analyzing IID’s agricultural conservation report, writing the RFP and contract for an analyst for IID agricultural conservation, acting as the Authority contact for the AWWARF arsenic study, End Use Studies for Residential and Commercial-Institutional customers and participating in Public Affairs’ trihalomethanes effort.

Volt VIEWtech, Inc. (VIEWtech)

A business unit of Volt Information Sciences (VIS), VIS is a publicly owned corporation with sales in excess of $1 billion dollars annually, and employs over 20,000 people worldwide. VIEWtech began providing demand management services to the utility industry in 1979 (as Volt Energy Systems). Have provided services to more than 200 utilities throughout the United States, including over 100 in California alone. VIEWtech has serviced more than three million residential customers for clients. VIEWtech's service offerings include residential and commercial water and energy audits, audit analysis software, water and energy rebate program administration, direct measure installations, development of customer information systems, quality assurance inspections, meter reading and meter installations, and financing programs. Turnkey services include program design, marketing, field implementation, computerized tracking, and project evaluation.

Field offices are located in a number of cities throughout the United States and VIEWtech Division offices are headquartered in Anaheim.

Current and Recent San Diego Projects

- San Diego County Water Authority Residential Survey Program
- San Diego County Water Authority Professional Assistance for Landscape Management (PALM) Program
- Municipal Water District of Orange County Toilet and Clothes Washer Rebate Programs
- American Water Company Clothes Washer Rebate Program
- Los Angeles Department of Water and Power Consumer Rebate Program
- San Diego Gas and Electric Company Retention Surveys
- Southern California Gas Company Energy Efficiency Rebate Program